

WHAT IS CLAIMED IS:

1. An apparatus, comprising,
a substrate having a surface;
an organic field-effect transistor located adjacent said surface of said substrate, said transistor comprising a gate, a channel, a source electrode, and a drain electrode; and
wherein said channel comprises a densified layer of organic molecules with conjugated multiple bonds, axes of said organic molecules being oriented substantially normal to said surface.

2. The apparatus of claim 1, wherein said densified layer of organic molecules has a surface density of at least about 7 molecules/nm².

3. The apparatus of claim 1, wherein said densified layer is defined by said organic molecules having an average separation of less than about 3.8 Angstroms.

4. The apparatus of claim 1, wherein said densified layer is defined by said organic molecules having a uniform orientation that provides a polarization ratio of greater than about 1.

5. The apparatus of claim 4, wherein said uniform orientation
is substantially coincident in a direction of current flow between
said source and drain electrodes.

6. The apparatus of claim 1, wherein said substrate comprises
an elastomer, wherein said elastomer has a glass transition
temperature (T_g) of less than about 30°C.

7. The apparatus of claim 6, wherein said elastomer is an
alkyl-substituted polysiloxane.

8. The apparatus as recited in Claim 6, wherein said organic
molecules have substantially coplanar aromatic groups.

9. The apparatus as recited in Claim 1, wherein said organic
molecules are linear organic molecules.

10. The apparatus as recited in Claim 1, wherein said organic
molecules are covalently bonded to said surface.

11. The apparatus as recited in Claim 1, wherein said channel
has a field effect mobility of at least about $10^{-4} \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$.

12. A method comprising,

providing a substrate; and

forming a channel for an organic field-effect transistor,

comprising:

expanding said substrate from an original configuration to increase a dimension of said substrate to an expanded dimension;

forming a layer of organic molecules with conjugated multiple bonds on said substrate while in said expanded dimension;

and

returning said substrate to substantially said original configuration.

13. The method of Claim 12, further including forming a gate, a source electrode, and a drain electrode of said organic field-effect transistor.

14. The method of Claim 12, wherein said substrate is a first substrate, and said method further includes forming a gate, a source electrode, and a drain electrode of said organic field-effect transistor on a second substrate and positioning said channel between said source and drain electrode and proximate said gate by coupling said first and second substrates together.

15. The method of claim 12, wherein said expanding comprises
2 heating at least a portion of said substrate.

16. The method of claim 12, wherein said expanding comprises
2 mechanically stretching a portion of said substrate in a lateral
3 dimension substantially coincident with a direction of current flow
4 between said source and drain electrodes.

17. The method of claim 12, wherein said expanded dimension
2 is at least about 10 percent longer than an equivalent portion of
3 said substrate in said original configuration.

18. The method of claim 12, wherein returning comprises
2 relaxing said expanded dimension to substantially said original
3 configuration in a direction substantially coincident with a
4 direction of current flow between said source and drain electrodes.

19. The method of claim 12, wherein forming said layer of
2 organic molecules comprises covalently bonding an end of said
3 organic molecules to said substrate.

20. The method of claim 12, wherein said channel has a
2 surface density of said organic molecules at least 10 percent

3 greater than a surface density of said organic molecules formed on
4 said substrate in said original configuration.